BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of a Working Case	)	
to Explore Emerging Issues	)	**File No. EW-2017-0245**
in Utility Regulation	)	

RENEW MISSOURI'S COMMENTS
ON DISTRIBUTED ENERGY RESOURCE ISSUES

COMES NOW Renew Missouri Advocates ("Renew Missouri"), pursuant to the Commission's September 6, 2017 *Order Seeking Responses Regarding Distributed Energy Resource Issues and Scheduling a Workshop Meeting*, and submits the attached comments on the issues raised in the Commission's Order.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I certify that copies of the attached comments have been mailed, emailed, or hand-delivered to all counsel and parties of record this 20th day of October, 2017.

/s/ Andrew J. Linhares

MEMORANDUM

To: Missouri Public Service Commission,
File No. EW-2017-0245

From: James Owen, Executive Director
Renew Missouri

Subject: Renew Missouri Comments on Distributed Energy Resource Issues

Date: October 20, 2017

Renew Missouri is pleased to submit the following comments in the Missouri Public Service Commission's ("the Commission") Workshop Docket EW-2017-0245, relating to the emerging issues in utility regulation, especially regarding distributed energy resources (DERs). Renew Missouri was supported in preparing these comments by the Pace Energy and Climate Center, a project of the Pace University Elisabeth Haub School of Law, White Plains, New York. In these comments, Renew Missouri provides responses to the questions posed by the Commission in its "Order Seeking Responses Regarding Distributed Energy Resource Issues, and Scheduling a Workshop Meeting" ("the Order"), issued on September 6, 2017 in this case.

I. ABOUT RENEW MISSOURI AND PACE ENERGY AND CLIMATE CENTER

Renew Missouri is a not-for-profit organization 501(c)(3) organization committed to promoting renewable energy and energy efficiency in Missouri. Since 2006, Renew Missouri has represented these policy interests before the Missouri General Assembly, the Public Service Commission, and in the hallways of local government throughout the state. In this work, Renew Missouri works closely with businesses, residential consumer groups, and utility companies to develop practical solutions to these very real issues. Renew Missouri has successfully championed and advocated for laws including the creation of renewable energy standards as well as protections for the customers of solar, wind, and energy efficiency programs. All of these

activities are geared towards Renew Missouri's stated message of making this state a national leader in renewable energy and energy efficiency policy.

Pace Energy and Climate Center ("Pace") is a project of the Elisabeth Haub School of Law at Pace University. Pace's offices are located in White Plains, NY. As a non-partisan legal and policy think tank, Pace develops cost-effective solutions to complex energy and climate challenges, seeking to positively transform the way society supplies and consumes energy. For more than twenty-five years, Pace has been providing legal, policy, and stakeholder engagement leadership in New York, the Northeast, and other jurisdictions. Located on the campus of the Elisabeth Haub School of Law, Pace engages and leverages a strong legal faculty and student body in its work, particularly through the internationally recognized Environmental Law Program and the Pace Land Use Law Center. Pace has many years of success in working with and supporting the New York State Energy Research and Development Authority, the New York Public Service Commission ("Commission"), and the New York Department of Environmental Conservation. Pace's work also includes strategic engagement with state legislative and executive officials, as well as in key Commission proceedings. In these capacities, Pace has had the opportunity to form long-lasting partnerships within the community of non-governmental organizations that work in the field of energy. Pace is actively involved in the New York Reforming the Energy Vision ("NY REV") process, and in grid modernization processes in Maryland, Massachusetts, and other states. Pace's Executive Director, Karl R. Rábago, is a former Texas public utility commissioner and utility executive, and has appeared before the Missouri Commission in several capacities over the past five years. Most recently, Mr. Rábago participated in a presentation on avoided costs in this Working Case, in his private capacity as principal of Rábago Energy LLC.

II. GENERAL COMMENTS

Renew Missouri applauds the Commission's initiative in establishing this Working Case and in raising issues particular to distributed energy resources ("DER").

Renew Missouri defines DER as any and all services and technologies deployed or operating at distribution level in the electric grid, whether "behind" or on the utility side of the customer meter. DER includes all manner of demand-side management ("DSM"), energy efficiency, and conservation technologies and services operating at the customer level or at the distribution level of the grid. DER also includes distributed generation, energy storage devices, smart grid technologies deployed or operating at distribution level, modern electrical devices and equipment such as electric vehicles (especially in grid-connected and vehicle-to-grid configuration), and other systems which can be operated to consume, inject, or manage the consumption or generation of energy at the distribution level. Renew Missouri does not believe that numerical limits, such as kW or MW capacity, are appropriate for use in defining DER as the technologies and ways in which they are used is constantly evolving.

Renew Missouri asserts that DER may be understood as group of resources. Resources are technologies or assets that can be drawn upon by the utility or its customers in supporting the effective functioning of the electric grid and the provision of reliable, resilient, and affordable electric service. Therefore, it is critical that the regulatory approach to the expanding universe of DER be set on finding ways to deploy, operate, and support the deployment and operation of DER as a cost-effective alternative to traditional utility-scale generation, transmission, and distribution technologies and approaches. This in turn requires development of evaluation and analysis tools and capabilities such as improved planning techniques, more robust benefit-cost

analysis frameworks, and platforms for technological experimentation, demonstration, and piloting.

The electric utility system is experiencing a revolution in scale—as smaller, right-sized resources are demonstrating their value in increasing deployment and operation. As articulated in "Small Is Profitable: The Hidden Economic Benefits of Making Electrical Resources the Right Size," properly considering the economic benefits of "distributed" (decentralized) electrical resources typically raises their value by a large factor, often approximately tenfold.[1] Consideration of economic benefits improves system planning, service quality, utility construction and operation (especially of the grid), and highlights societal costs. Supporting the deployment and wise use of DER will advance and enhance the public interest inherent in electrical rates and services in Missouri. To that end, Renew Missouri encourages the following general considerations in considering issues relating to DER:

1. Systems perspective

The Commission should continue to take a holistic, systems perspective in evaluating and facilitating the increased reliance on DER to meet the need for electrical service. DER deployment success is fundamentally dependent upon developing a more data- and information-rich market environment for customers and energy decision makers. Evolution of the utility sector must also integrate environmental performance imperatives and advance the opportunities for development of new markets for services and technologies, especially those that empower customers and promote new investment and third-party market participation. Reliability, resilience, and affordability must also be key to informing DER deployment and resource,

[1] Amory Lovins, E. Kyle Datta, Thomas Feiler, Karl R. Rábago, Joel N. Swisher, Andre Lehmann, and Ken Wicker, "Small Is Profitable: The Hidden Economic Benefits of Making Electrical Resources the Right Size," Rocky Mountain Institute (2002). Available at: http://library.uniteddiversity.coop/Money_and_Economics/Small-is-Profitable.pdf

especially as relates to low- and moderate-income customers and communities. Finally, the Commission's view of DER must embrace both near- and long-term perspectives. The embedded costs of the current electric system demonstrate huge inertia. Major changes must be strategic, started early, measured often, and corrected when necessary.

2. Market development and job creation

Missouri is already home to an emerging DER market sector. With a conscious and coordinated effort, these emerging markets will continue to grow and flourish, enhancing economic and job opportunities in Missouri. It is entirely appropriate that the Commission, as an economic regulator, play a role in expanding opportunities for these benefits through development of markets for DER technologies and services. Many DERs are labor intensive, and as local resources, demonstrate enhanced local economic development benefits. The jobs, tax base, and other economic development benefits of DERs should be front and center in policy development and implementation concerns.

3. Enabling and engaging customers

DERs are fundamental to transforming the ways in which customers interact with electricity service providers and the grid. DERs and the integrated information systems that enable their effective operation mean that customers can manage and reduce their electric bills and household energy burdens, contribute to a stable and less expensive grid for all customers, and help reduce the societal impacts of electricity generation and use. Utility-centric perspectives on DER tend to approach these technologies as complicating factors and integration problems to be solved, rather than resources to be deployed and harnessed. To realize the full opportunity of DER, regulation must encourage utilities to adopt a customer-facing perspective in addition to and balanced with the traditional utility-centric approach.

4. Enhancing reliability and resilience

Distributing functionality into the grid can substantially enhance reliability and grid resilience. Self-healing networks and segment-able grid architecture can reduce the consequences of outages. Pervasive informational systems that facilitate utility visibility into grid operations and customer opportunities to respond to real-time grid conditions can forestall cascading outage conditions before they become unmanageable. In a word, properly deployed, connected, and operated DERs are tools in the reliability and resilience toolbox. Perhaps one of the most compelling, systemic realizations of optimal deployment of DERs is embodied in the concept of the microgrid. Bundled DERs integrated through a management platform can provide valuable ancillary services and grid support in grid-connection conditions in which they will operate the vast majority of the time. In times of system stress, they become islands of reliable emergency service that can greatly reduce the impacts of disaster events.

5. Affordability of energy services, today and tomorrow

As already mentioned, DERs offer huge opportunity to reduce energy bills and waste. Efficiency and demand management resources can target utility costs. Distributed generation can provide flat-price local generation that, when properly valued, offers a cost-effective alternative to traditional utility-scale generation. DERs can empower customers through community energy projects, energy management tools and aggregations, local environmentally-friendly generation, and almost unimagined opportunities to exercise control over household and business energy use. The savings that individually empowered customers accrue through use and operation of DERs can result in savings for all customers through avoided system costs.

6. The Missouri Opportunity

Missouri stands in an excellent position to improve the modernization of its grid through increased deployment and operation of DER in the context of a grid modernization agenda. The GridWise Alliance/Clean Edge Grid Modernization Index[2] currently ranks Missouri at 22nd overall in the United States for state support of grid modernization, customer engagement, and grid operations. The Index, which measures deployment of various DERs, key policy and market structures for grid modernization, consumer education, incentives, innovative rates, grid automation, and other factors, provides a useful overview of the role that DER can play in a grid modernization strategy.

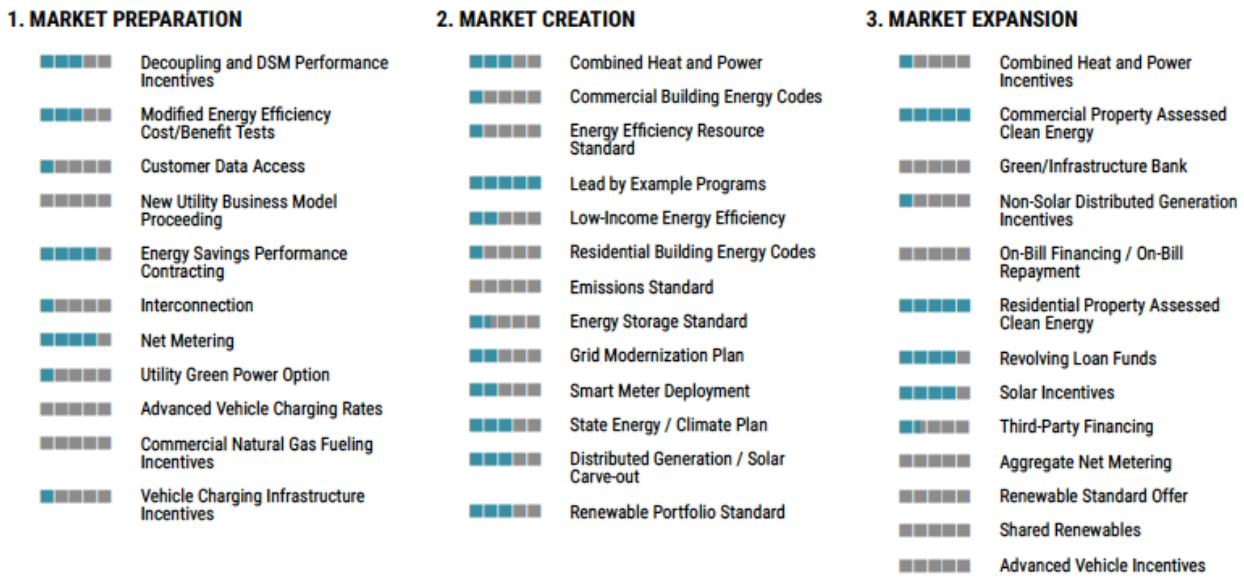
III. RESPONSES TO COMMISSION QUESTIONS

1. What are the current levels of distributed energy resources (energy efficiency, distributed generation, demand-response, etc.) in Missouri?

Renew Missouri does not maintain or have access to comprehensive data concerning the levels of DER deployment and operation in Missouri. Renew Missouri supports the Commission's effort to accumulate the baseline data.

The Center for the New Energy Economy and The Nature Conservancy have developed the State Policy Opportunity Tracker for Clean Energy,[3] which gathers existing information relating to 37 clean energy policies at the state level. A snapshot of the gap analysis for Missouri reveals some progress and abundant opportunities for clean energy development in the state. Many of these indicators relate to DERs:

[2] GridWise Alliance & Clean Edge, "3rd Annual Grid Modernization Index," GridWise Alliance (Jan. 2016). Available at: https://cleanedge.com/reports/3rd-Annual-Grid-Modernization-Index
[3] Available at: https://spotforcleanenergy.org



Under the current statutory and regulatory scheme in Missouri, net metering is the most substantial distributed energy resource available to consumers. The best way to measure such resources is through the number of customers engaged as well as the number of jobs employed that can be connected to these distributed energy resources.

Given there is no centralized receptacle for data regarding rural electric cooperatives (largely deregulated at the state level) or for municipal-owned utilities (managed and regulated by city managers and city councils), this cannot be quantified at a statewide level. However, investor owned utilities' ("IOUs") net metering data is available via the Commission and shows that as of 2016, there were 7,800 net metering customers in Ameren, KCP&L, KCP&LGMO, and Empire Electric District service territories.[4]

Out of the almost two million (1,999,700) customers served by these IOUs, 7,800 represents a burgeoning sector of consumers who have only begun to take advantage of recent changes to Missouri law and have educated themselves despite the coordinated efforts of dirty-energy enablers to misdirect and distort the facts on the benefits of net metering. Were there laws

[4] Missouri Public Service Commission, Net Metering Reports for calendar year 2017. Available at: https://psc.mo.gov/Electric/Net_Metering_Reports

and regulations in place to encourage IOU's to actively promote and provide these services, there is no doubt such laws and regulations would serve as a carrot to entice more customers into taking advantage of net metering.

An examination of installed solar throughout Missouri can offer a more generalized look at distributed energy resources. According to the Solar Energy Industry Association (SEIA),[5] 152.9 MW of installed solar is operating in Missouri, with 19.2 MW installed in 2016 alone. An additional 263 MW of solar capacity is anticipated over the next five years. Added up, this would be about an increase of 170% in installed solar over a ten-year period.[6] Missouri has 17,000 homes powered by solar, and employs about 2,400 workers in solar jobs. Nationally and in Missouri, there has been a 55% price decline in solar over the last five years. With strong supportive policy and regulatory implementation, the future of solar in Missouri is bright.

A clearer, if less conclusive, figure comes from looking at renewable energy and energy efficiency jobs as broken down by sector and by technology. According to the Clean Jobs Midwest report,[7] in 2016 there were 40,048 jobs in the Missouri energy efficiency industry. Precisely quantifying these figures is complicated as many businesses are reluctant to label themselves as "energy efficiency" due to stigma within IOU's and rural electric cooperatives to this seemingly uncontroversial term.

The report also listed there were 3,594 Missouri renewable energy jobs in 2016. This can be broken down by categories even further to 2,663 solar jobs and 931 wind jobs across the state.

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[5] Solar Energy Industries Association, Missouri Solar. https://www.seia.org/state-solar-policy/missouri-solar

[6] Solar Energy Industries Association, Solar Spotlight: Missouri. Attached as Appendix A. Available at: https://www.seia.org/sites/default/files/2017-09/Federal_2017Q2_Missouri.pdf

[7] Clean Jobs Midwest 2017, Missouri. Attached as Appendix B. Available at: https://www.cleanjobsmidwest.com/wp-content/uploads/2017/09/CJM-2017-ExeSum-MO.pdf

2. Should previous Commission policy decisions regarding demand-response aggregation be reconsidered?

Renew Missouri supports the Commission's reconsideration of its decisions relating to demand-response aggregation. Demand response technologies, services, and capabilities are rapidly evolving and improving. In 2010, the Commission initiated a proceeding to consider questions relating to the participation of customer demand-side resources facilitated by Aggregators of Retail Customers ("ARCs") in RTO and ISO markets. The Commission identified a number of legal and policy questions to consider, initiated a workshop process to address them, and placed a temporary prohibition against RTOs and ISOs accepting bids from retail customers or ARCs who aggregate electric utility customers' demand response load reductions.[8] Significant developments in technology and markets have occurred since the Commission's last review of the opportunity. For example, in just the past few years, a robust discussion has emerged about the opportunity to use blockchain technology to enhance many electricity system functions, including demand response.[9] Demand response is a valuable tool in not only reducing utility system peak demand-related costs, but also in facilitating high penetration of variable renewable resources such as distributed solar and increasing system reliability.[10] Demand response is useful in improving load diversity, distribution system asset utilization, and system load factor—all of which can result in lower cost of service. Demand response offers an excellent opportunity to introduce market forces into the electric system.

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[8] *See, e.g.*, Docket No. EW-2010-0187, *Order Temporarily Prohibiting the Operation of Aggregators of Retail Customers* (March 31, 2010), at p. 6.

[9] *See, e.g.*, Douglas Miller & Claire Henly, "Blockchain is Reimagining the Rules of the Game in the Energy Sector," Rocky Mountain Institute (Aug. 28, 2017). Available at: https://www.rmi.org/news/blockchain-reimagining-rules-game-energy-sector/

[10] *See* Jim Lazar, "Teaching the 'Duck' to Fly," Regulatory Assistance Project (2d. Ed, Feb. 2016). Shortened version attached as Appendix C. Available at: http://www.raponline.org/wp-content/uploads/2016/05/rap-lazar-teachingtheduck2-2016-feb-2.pdf

Finally, demand response aggregation offers an increasingly valuable tool for empowering customers to engage with the grid and reduce their electric bills while contributing to system-wide cost reductions for all customers.

3. Should a model state tariff be designed?

The universe of DER technologies and services is diverse and growing. The regulatory and administrative challenges associated with developing technology- and service-specific tariffs for every type of DER or DER combination are daunting. For that reason, there has been increasing discussion and effort to develop model tariffs that can be adapted to a wide range of DERs operating alone and in combinations. The concept behind a model tariff is that, while the specific cost and benefit *values* of DER may change from one service territory or even grid location to another, there is benefit in developing a model tariff *structure* in which to reflect those values. There is also benefit in taking a holistic view of DER-related tariffs to ensure against unintended discrimination against certain types of DERs.

Renew Missouri believes that, while the time may not yet be right to pursue a full "value of DER" tariff development process in Missouri,[11] it is the right time to develop and begin to implement an agenda of preparatory "building block" processes. Building blocks that the Commission should consider include:

- Marginal emissions rates studies – Quantitative evaluation and characterization of the marginal emissions impacts of DER operations, so as to understand the environmental benefits or costs of those operations.

[11] *See, e.g.*, Robert Walton, "New York REV orders promise growth for diverse set of distributed resources," Utility Dive (Mar. 15, 2017). Available at: http://www.utilitydive.com/news/new-york-rev-orders-promise-growth-for-diverse-set-of-distributed-resources/438044/

- Marginal cost of service studies – Quantitative evaluation of the distribution and other infrastructure requirements necessitated by increased load at particular locations in the grid, and the value of avoidable investments.
- Benefit-cost analysis ("BCA") framework – A common, transparent, and comprehensive analysis framework for ultimately comparing the relative merits of distributed and utility-scale resource options.
- Standardized distribution system planning – A framework and requirements for extending integrated resource planning concepts into the distribution level.
- Customer data acquisition and sharing issues – Rules and technologies for increasing the availability and dissemination of customer data.
- Hosting capacity studies – Quantitative analysis of the ability of the current grid to "host" increasing penetrations of distributed energy resources, and identification of strategies and options for increasing hosting capacity.
- Non-wires solutions projects – Processes and approaches identifying traditional infrastructure investments that could be avoided or deferred through targeted deployment and operation of DER. Essentially, the task will result in the development of sub-nodal marginal distribution system capacity costs that can benchmark the opportunity for DER deployment.
- Pilots and demonstration projects – Nothing teaches like actual practice. Utilities should develop proposals for projects that would result in the deployment and operation of DERs, preferably in combination with microgrids or non-wires solutions projects.

- Interconnection procedure improvements – The Commission should establish a utility and stakeholder working group to track and address interconnection issues associated with increasing DER deployment and operation.

4. Should changes be made to the Integrated Resource Planning (IRP) process to accommodate increased use of distributed energy resources?

Renew Missouri believes that core concepts of integrated resource planning ("IRP") remain sound. Missouri Rule 4 CSR 240-22 provides a sound foundation for addressing the more complex range of issues and resource opportunities that are associated with increased DER deployment and operation. A key fundamental shift in traditional utility thinking that is necessary and that can be introduced through modification of the IRP process in Missouri is recognition that *a DER can be a resource for planning and operations purposes, even if it is not operated and fully controlled by the utility.*

The opportunities presented by DER require an expansion of traditional techniques and the scope of analysis into the distribution system, and will add complexity. For example, as some level, targeted demand reduction through energy management is a resource that can be compared to a planned distribution transformer or conduit upgrade. A localized, systematic integrated resource plan can serve as the framework in which that comparative resource evaluation can occur. Renew Missouri would also point out that these improved and enhanced planning capabilities will be valuable in ultimately developing value-based analysis tools for DER deployment support programs. Key to continuing and enhancing IRP into the local distribution level is maintaining and expanding transparency and public participation. It is also critical that planning for grid modernization and integration of DERs include development of performance-

based metrics for evaluating and comparing resources, plans, and plan outcomes.[12] At a high level, Renew Missouri recommends that improved integrated resource plans must address:

1. Distribution System Planning
    a. Forecast of Demand & Energy Growth
    b. Available DER Resources
    c. Delivery Infrastructure Capital Investment Plans
    d. Beneficial Locations for DER Deployment
    e. Hosting Capacity
2. Distribution Grid Operations
    a. System Operations
    b. Volt/VAR Optimization (VVO)
    c. Interconnection Process
    d. Advanced Metering
    e. Customer Data
    f. Probabilistic Modeling and Load Flow Analysis

5. What information about distributed energy resources do the Regional Transmission Organizations need? What information do the utilities have? And what information are the utilities providing to the Regional Transmission Organizations?

Renew Missouri would note that DERs can effectively interact with Regional Transmission Organizations ("RTOs") through aggregation and the development of protocols and products designed with DERs in mind. Just as grid modernization can improve utility

[12] Translating the results of this planning and performance-based metrics into performance-based regulation and rates is a much more complex endeavor, necessitating a great deal more regulatory engagement at the front end of the effort.

visibility into the distribution system for reliability and efficiency benefits, grid modernization efforts focused on market development and customer engagement can identify opportunities for increased customer interaction with RTO operations, either individually (for larger customers) or through aggregation. Renew Missouri looks forward to working with the Commission, Staff, and other parties to realize these opportunities.

6. Is any new behind-the-meter technology or hardware needed to accommodate or facilitate the development of distributed energy resources?

Utilities across the U.S. and around the world are investigating and deploying a wide range of grid modernization hardware, software, and operational upgrades. These include: distribution automation, distribution management systems, distributed energy resource management systems, microgrids, and others. These investments are improving utility downward visibility into distribution system conditions for more efficient system management, problem identification, and corrective action.

What is critical, and often lacking, is utility investment in customer-facing grid modernization technologies and improvements. For example, DER markets benefit from:

- Revealed dynamic system marginal distribution capacity costs for targeting demand response
- Hosting capacity values and "heat maps" of distribution system loading for targeting DER deployment locations
- Interconnection agreement processing status and tracking
- DG and DR interaction portals

As utilities deploy grid modernization technologies such as distribution automation, distribution management systems, distributed energy resource management systems, meter data

warehouses, and customer information systems, they must also be required to plan ahead for increased reliance on behind the meter information gathering and tracking systems, customer equipment and appliance tracking and control technologies, and the rapidly expanding world of energy management "apps" and tools. The utilities must deploy their systems with an open-architecture, information-rich design integral to their system architecture to leverage third-party investment and engagement in the DER marketplace.

7. Will any distribution system upgrades be required to accommodate or facilitate the development of distributed energy resources?

Renew Missouri believes that the utilities should be tasked with developing a comprehensive plan addressing grid modernization efforts, with a special focus on how grid modernization will support increased DER deployment and operation.

Grid modernization envisions a deliberate shift in a utility's approach to infrastructure, services, and engagement with customers and markets that results in a modern electric system that will be cleaner, more efficient and reliable, and will empower customers to manage and reduce their energy costs.[13] Grid modernization facilitates the maximum cost effective integration of solar, wind, and other local and renewable sources of power, can minimize outages by automatically re-routing power when lines go down, and can immediately alert the utility when customers have lost power. In a modern electric grid environment, customers will have new tools and information to enable them to use less electricity when prices spike, and as a result, the electric system will be appropriately sized and less expensive in all ways.

[13] This language is adapted from the order of the Massachusetts Department of Public Utilities Order D.P.U. 12-76-B, and is representative of similar regulatory guidance and direction on grid modernization in other jurisdictions.

Like a well-developed IRP, a sound grid modernization plan should take a long view of at least ten years and also specify a short-term action plan. The grid modernization plan should outline how the utility plans to make measurable progress toward grid modernization objectives. Grid modernization objectives should include, among others as determined by the Commission, the following: (1) reducing the effects of outages; (2) optimizing demand, which includes reducing system and customer costs; (3) integrating distributed energy resources; and (4) improving workforce and asset management. Utility grid modernization plans should outline their timing and priorities for all their grid modernization planning and investment over the planning horizon. The grid modernization plan must include a well-funded marketing, education, and outreach plan; a research, development, and deployment plan; and proposed infrastructure and performance metrics to measure progress in achieving grid modernization objectives. Because customer education, marketing, and outreach are crucial to enabling the successful implementation of grid modernization, the utility's marketing and outreach should begin early in the grid modernization process and should not only have ample resources but talented, dedicated personnel staffing such programs.

Personnel are also key to assuring performance-based metrics are successful. In this period of attrition of state personnel, funding must be secured to ensure auditors and analysts are on Commission Staff to make sure metrics are accurate and effective. By placing metrics into place without sufficient resources, these numbers could not only be meaningless but potentially detrimental to real progress in these areas.

The grid modernization short term action plan should be focused on development and deployment of advanced metering functionality ("AMF"), a suite of foundational technologies and capabilities that improve utility visibility into grid conditions, and establish the technology

platform for active customer engagement with the smarter grid. The short-term plan should review and propose capital investments in infrastructure and systems designed to operate as an integrated whole to balance supply and demand in an integrated fashion, and to enable the enhancement of customer opportunities to engage with grid operations through the deployment and operation of distributed energy resources including distributed generation, distributed energy storage, demand response, and others.

In setting requirements for grid modernization planning, the Commission should emphasize outcomes, including more clean and distributed resources, more high-intelligence and self-healing networks, and more customer empowerment. A compliant grid modernization plan should:

- take a 10-year view and include a 5-year investment plan;
- include metrics that can be used to track progress toward achieving the Commission's grid modernization objectives;
- result in new grid investments, an information-rich service environment, new tools and services for customers, and growth in the deployment of DG and other DER against baseline conditions; and
- be customer-facing, and reflect engagement with and empowerment of customers, directly and through aggregators and/or competitive third-party service providers.

Grid modernization is complex and, for most customers, novel. Both technology deployment and customer education will take time. A reasonable grid modernization plan will therefore take a system view and pursue all objectives, such as the four objectives previously listed, in balance. Customer education and deployment of technologies that enable customer services and engagement in enhanced energy services must begin at the same time that the utility

plans to deploy AMF and associated distribution infrastructure. Measures to reduce the effects of outages should be integrated into a holistic plan that assesses costs as well as opportunity costs. Because of the dynamic nature of the process of grid modernization, as well as the rapid evolution of technology, the grid modernization plan must also include a research, development, and deployment ("RD&D") plan.

Grid modernization generally involves both utility-facing and customer-facing investments and initiatives. Utility-facing investments relate to improving visibility of grid conditions down to an increasingly granular level, modernizing systems, improving information technology-based functionalities, and developing the utility workforce. Grid modernization also involves customer-facing investments and initiatives that are ultimately about how customers can engage with the modern grid and its enhanced capabilities and services.

Grid modernization should embrace an exciting new relationship between customers and their electric service providers. One key overall purpose of the grid modernization effort must be to empower customers to manage and reduce their energy costs, through access to and reliance on new tools and better, more timely information based on real-time grid conditions. Grid modernization should empower customers to engage with the grid to reduce their own energy bills and likewise contribute to savings for all customers through more efficient use of a more appropriately sized electric system. It is therefore vital that customers are well informed about and engaged in their options for managing their energy consumption; the tools and technologies that will assist them in exercising their desired degree of control over their energy use; and the benefits associated with reductions in consumption and/or shifting consumption away from peak periods. A customer education and marketing outreach plan is therefore an essential component of a sound grid modernization plan. It is important to repeat that the Commission should require

a substantial budget that ensures an optimal number of customers are aware of these new innovations.

Whether grid modernization can occur as outlined above without legislative involvement relies crucially on the willingness and engagement of utilities as well as regulators.

8. What process should be developed to provide for resource accreditation, including consideration of capacity factors?

Renew Missouri offers no response to this question at this time.

9. Are there any other issues related to distributed energy resources that should be brought to the Commission's attention?

Renew Missouri wishes to direct the Commission's attention to a few additional issues not specifically addressed in the questions it posed.

A. *Equitable Access to Sustainable Energy ("EASE")*

EASE means that all customers, including low-income customers and customers living in economically and/or environmentally disadvantaged communities will share in the benefits and opportunities of modern electric technologies, investments, and operations. Renew Missouri encourages the Commission to specifically adopt a focus on EASE issues in every aspect of this Working Case, and with that special attention, seek to integrate EASE into grid modernization, DER deployment initiatives, rate design, and other aspects of this case. Low-income customers face increasing energy burdens, are disproportionately burdened with the adverse consequences of energy production and use, and tend to be disproportionately impacted by grid outages. A conscious policy and implementation focus on addressing these problems will reveal abundant opportunities to include low-income and environmentally-disadvantaged customers and communities in the benefits of change.

Renew Missouri has identified two pathways for EASE, specifically on the issue of low-income access to solar energy. The first option requires coordination with state community action agencies through the Low-Income Home Energy Assistance Program ("LIHEAP") to provide community solar for customers in need. A useful case study is found in Colorado's Poudre Valley Rural Electric Association ("PVREA"), which partnered with the not-for-profit Grid Alternatives[14] and the Colorado Energy Office to access LIHEAP funds to provide energy savings to income-eligible customers. Of note for this discussion: Colorado has a community solar-enabling statute,[15] and cooperative utilities are partially regulated by that state's Public Utility Commission. The Colorado program is available to all PVREA residential members, and provides the actual energy savings to low-income members that meet the utility's income qualifications. The program is available over a four-year period for income-eligible participants and eligibility levels vary by county calculated at or below 80% of the Area Median Income ("AMI"). After this four-year period, under the theory of the program, participants should be able to improve their economic outlook and allow for other income-eligible community members to participate. Thanks to program's success, the Colorado Energy Office and Grid Alternatives are partnering with five additional utilities to offer community solar to income-eligible customers.[16] While we see this option as the most viable path forward for low-income solar, proposed cuts to LIHEAP and the Weatherization Assistance Program ("WAP") from the federal government make long-term planning challenging.

[14] GRID Alternatives is a not-for-profit organization that brings together community partners, volunteers, and job trainees to implement solar power and energy efficiency for low-income families, providing energy cost savings, valuable hands-on experience, and a source of clean, local energy.
[15] Colo. Rev. Stat. § 40-2-127.
[16] https://gridalternatives.org/regions/colorado/get-solar/community-solar?_ga=2.211877012.107534670.1507666551-1037771586.1507666551

There is an additional program option not contingent on federal funding, sometimes referred to as the "Sweat Equity" approach. Participant members work on the development of the project in exchange for energy savings to their household. Not only does this benefit the participants, but this reduces labor costs for the program operators. This will also provide participants with training for skills to work in clean energy industries. Grid Alternatives and Habitat for Humanity[17] have used this approach with successful outcomes.[18] Additionally, the Department of Housing and Urban Development ("HUD") has provided grant funding for sweat equity programs for affordable homes for low-income families.[19] This type of program should include a workforce development training program with a focus on minority and low-income participants in order to have long-term benefits for these participants and their communities.

B. *Electric Vehicles and Transportation Electrification*

Electric vehicles of all types are increasingly affordable and suitable as replacements for petroleum-fueled transportation. Increasingly affordable renewable energy supply and smarter grids mean that there is a huge opportunity to electrify transportation without environmental regrets. Emergent Vehicle-to-Grid technologies and capabilities promises new mobile energy storage resources and load growth opportunities for utilities. The environmental benefits of transportation electrification are profound. The Commission should include transportation electrification in its evaluation of DERs and explore new regulatory approaches to encourage the deployment of electric vehicles and maximize the benefits of their use.

As recent Commission rulings indicate, there is a significant question as to whether this body has jurisdiction to allow utilities to include electric vehicle charging stations as a part of

[17] https://www.habitat.org/stories/what-is-sweat-equity
[18] Paulos, B. (2017, May 18). Bringing the Benefits of Solar to Low-Income Consumers. Retrieved October 12, 2017. The Executive Summary is attached as Appendix D. Available at: https://www.cesa.org/assets/2017-Files/Bringing-the-Benefits-of-Solar-to-Low-Income-Consumers.pdf
[19] https://www.hudexchange.info/news/hud-announces-9-9-million-in-sweat-equity-grants/

rate base. The Legislature could resolve this issue by explicitly giving the Commission this ability via statute. In the event the Legislature declines to do so, there are various third-party ownership models that could be incentivized in Missouri.

C. *Energy storage*

Electrical and thermal energy storage represents a game-changing opportunity for the electric grid. The Commission should continue to support and encourage growth of energy storage markets at all levels, including behind the meter and community scale.

D. *Customer education*

The modern grid will yield its maximum potential only if customers can and do engage in a way that minimizes their bills and maximizes their control over their energy use. The first, fundamental step in customer engagement, and the one that takes the longest lead time, is customer education. The Commission should direct the utilities to develop customer education plans, with a guarantee of robust funding and staffing of such programs, to accompany DER deployment and grid modernization activities. This will pave the way for successful deployment of innovative rates and services.

E. *Community aggregation*

Community aggregation strategies offer the opportunity to expand DER markets in ways that empower customers and take advantage of economies of scale. When DERs are deployed in combination at the community level, they can form the core of microgrids. Finally, community scale DERs can be targeted for deployment at distribution system "hot spots," where they can provide maximum benefits to grid operational efficiency and reliability. The Commission should express its strong support for customer aggregation approaches as relate to distributed generation, distributed storage, energy management and demand response, and microgrids.

IV. CONCLUSION

Renew Missouri appreciates the opportunity to submit these responses and comments and looks forward to participation in the Commissions workshop meetings on this matter.